Abstract of the Disclosure

A method of increasing the HDL concentration and the HDL/LDL concentration ratio in human serum by providing a balance between a sufficient and required proportion of cholesterol-free saturated fatty acids in the daily dietary fat of the human and a sufficient and required, but not excessive, proportion of polyunsaturated fatty acids comprising linoleic acid in dietary fat, while the remaining proportion of fatty acids and energy from the dietary fat is provided by monounsaturated fatty acids comprising oleic acid. The saturated fatty acids must constitute between 20% and 40% by weight of the daily dietary fat based upon dietary fat accounting for 30% of the total dietary energy consumption, and linoleic acid must constitute between 15% and 40% by weight of dietary fat. In this way, the required proportional intake of polyunsaturated fatty acids enhances the formation of HDL from VLDL and/or decreases the clearance of HDL, while an excessive proportional intake of polyunsaturated fatty acids and monounsaturated fatty acids is avoided to assure a sufficient dietary availability of saturated fatty acids which are required for sufficient VLDL synthesis and HDL production.

ABSTRACT

In a double-blind crossover study, 23 healthy normocholesterolemic male volunteers were fed carefully designed whole food diets enriched by oleic acid (Canola, CAN), palmitic acid (palm olein, POL) or an American Heart Association Step 1 fat blend (AHA). Resident males received each diet during 3 consecutive 4-wk periods. The diets supplied approximately 31% energy as fat and <200mg cholesterol/day. The percent energy (% en) from each dietary fatty acid was strictly controlled to compare low-16:0, high-18:1 (CAN) or high-16:0, low-18:2 (POL) intake with a balanced intake of each (AHA). The first two diets represented direct exchange of 7 %en between 18:1+18:2 (CAN) and 16:0 (POL), whereas the main difference between POL and AHA was <4 %en exchanged between 16:0 and 18:2. Serum TC, VLDL-C and LDL-C were not significantly affected by the three diets despite manipulation of these key fatty acids. However, both CAN (low SATs, high MONOs) and POL (high SATs, low POLYs) depressed HDL-C significantly (-8 mg/dl) relative to the AHA (mod SATs, mod POLYs) diet. Consequently, the AHA diet increased HDL_3-C and lowered the LDL/HDL cholesterol ratio significantly relative to the CAN and POL diets. Neither serum Lp(a), apoA1, nor apoB were affected by diet. These data support the previous observation that in normolipemic humans consuming a moderate fat load (<31%en) low in myristic acid (14:0) and dietary cholesterol, the effect of palmitic acid (16:0) on TC and the LDL/HDL ratio is comparable to that of monounsaturated oleic acid (18:1). Furthermore, a definite intake of POLYs and SATs may be essential for maximizing HDL_3-C under these conditions.

Key words: fatty acids, palmitic ,oleic, lipoproteins, cholesterol, humans.